(BSP December 14, 2000)

Polymer Concrete

Mix Design

Polymer concrete shall be composed of the following three components - epoxy resin base, epoxy resin base hardener, and aggregate, in accordance with Section 6-02.2 as supplemented in these Special Provisions.

The Contractor shall prepare and submit the polymer concrete design mix and mixing procedure, including samples of all components for each lot, to the WSDOT Materials Laboratory for testing. The Contractor shall not begin ordering materials for application of the polymer concrete until receiving the Engineer's approval of the polymer concrete design mix and mixing procedure.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, quantity, and mixing ratio.

The material shall be stored to prevent damage by the elements and to ensure the preservation of their quality and fitness for the work. The storage space shall be kept clean and dry, and shall contain a high-low thermometer. The temperatures of the storage space shall not fall below nor rise above that recommended by the manufacturer. Every precaution shall be taken to avoid contact with flame.

Stored materials shall be inspected prior to their use, and shall meet the requirements of these Special Provisions at the time of use.

Any material which is rejected because of failure to meet the required tests or that has been damaged so as to cause rejections shall be immediately replaced at no additional expense to the Contracting Agency.

Sufficient material to perform the entire polymer concrete application shall be in storage at the site prior to any field preparation, so that there shall be no delay in procuring the materials for each day's application.

Material Health and Safety Training and Precautions

The Contractor shall arrange to have the material supplier furnish technical service relating to application of material and health and safety training for personnel who are to handle the polymer concrete.

Appropriate impermeable protective garments shall be used by all workers who may contact the resin or initiators to prevent skin contact. If skin contact occurs, the resin or initiators shall be immediately washed off. Clothing that becomes saturated with resin shall be removed immediately.

Equipment and Containment

All equipment for cleaning the concrete and steel surfaces, and mixing and applying the polymer concrete, shall be submitted to the Engineer for approval.

The epoxy resin, and abrasive blasting materials, shall be contained and restricted to the surface receiving the polymer concrete only, and shall not escape to the surrounding environment. The Contractor shall submit the method and materials used to collect and contain the epoxy resin, and abrasive blasting materials, to the Engineer for approval.

The Contractor shall not begin polymer concrete work, including surface preparation, until receiving the Engineer's approval of the equipment, and the collection and containment system.

Surface Preparation

Using the equipment, material, technique, and procedures established for surface preparation, the concrete and steel surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the polymer concrete. Surface cleaning shall be by abrasive blasting.

Precautions shall be taken to ensure that no dust or debris leaves the roadway deck and that all traffic is protected from rebound and dust. Appropriate shielding shall be provided as required at no additional expense to the Contracting Agency and shall be as approved by the Engineer.

If the concrete or steel surfaces become contaminated, the contaminated areas shall be recleaned by abrasive blasting at no additional expense to the Contracting Agency.

Application of Prime Coat

The area to receive the prime coat shall be surface dry prior to applying the prime coat. Immediately prior to applying the prime coat, the surfaces shall be swept clean by compressed air to remove accumulated dust and any other loose material.

The Contractor shall apply one coat of epoxy resin binder (prime coat) to the prepared concrete and steel surfaces immediately before placing the polymer concrete. The promoted/initiated resin shall be worked into the concrete in a manner to assure complete coverage of the area.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at no additional expense to the Contracting Agency.

Under no circumstances shall any resin run into drains or expansion joints, or otherwise escape the Contractor's collection and containment system.

Mixing Components

The epoxy resin binder in the polymer concrete shall be approximately 12 percent by mass of the dry aggregate. The exact percentage will be determined by the Engineer.

Accelerators or inhibitors may be required as recommended by the epoxy resin supplier.

The epoxy resin binder shall be initiated and thoroughly blended just prior to mixing the aggregate and binder.

Polymer Concrete Placement

The polymer concrete shall be placed on the liquid prime coat.

Under no circumstances shall any polymer mixture run into drains or expansion joints, or otherwise escape the Contractor's collection and containment system.

Finished Polymer Concrete Surface

The finished surface of the polymer concrete shall conform to the requirements of Section 6-02.3(10).

The polymer concrete shall be consolidated by means approved by the Engineer. Finishing equipment used shall strike off the polymer concrete to the established grade and cross section. Forms shall be coated with suitable bond release agent to permit ready release of forms.

The polymer concrete shall receive an abrasive sand finish as needed.

The sand finish shall be applied by hand immediately after strike-off. Sand shall be broadcast onto the surface before gelling occurs to effect a uniform coverage of a minimum of 435 grams per square meter.

The surface texture of polymer concrete surface shall be uniform. The polymer concrete shall be impervious to moisture.

Curing

Traffic and equipment shall not be permitted on the polymer concrete until it has achieved a minimum compressive strength of 10.3 MPa as determined by the rebound number per ASTM C 805.